

294/19.1

SEP 1982

# Patent Application (19) GB (11) 2 093 518 A

- (21) Application No 8137514
- (22) Date of filing 11 Dec 1981
- (30) Priority data
- (31) 8040059
- (32) 15 Dec 1980
- (33) United Kingdom (GB)
- (43) Application published  
2 Sep 1982
- (51) INT CL<sup>3</sup>  
E05C 1/12  
B25J 3/00
- (52) Domestic classification  
E2A 106 120 428 AM  
CAK  
B4W 6D
- (56) Documents cited  
GB 1395120  
GB 0624294  
GB 1373655  
GB 0589767  
GB 0825552  
GB 0750056
- (58) Field of search  
E2A  
B4W  
B8H

- (71) Applicants  
United Kingdom Atomic  
Energy Authority,  
11 Charles II Street,  
London SW1Y 4QP
- (72) Inventor  
Arnold Stanley Kearney
- (74) Agents  
United Kingdom Atomic  
Energy Authority,  
(John Edward Alderman),  
Patents Branch,  
11 Charles II Street,  
London SW1Y 4QP

(54) Means for attaching remote  
handling tongs

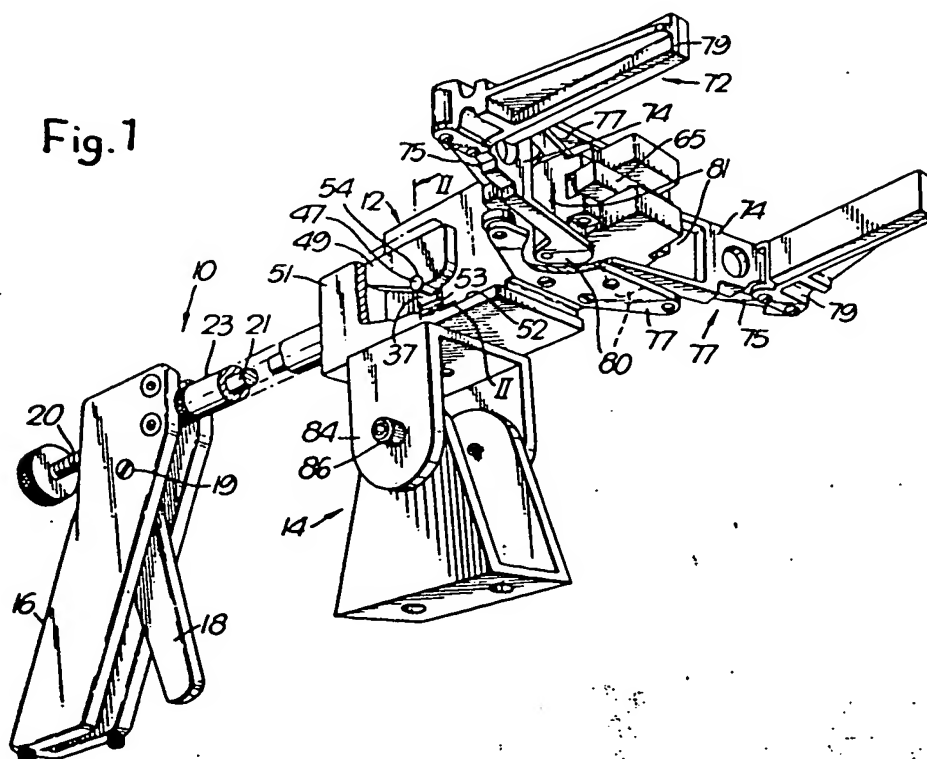
(57) A remote handling tong 10 has a  
replaceable slave head assembly 12  
provided with a spring biased latch 37

which engages a recess 33 in a barrel  
member 23 of the tong 10. The latch  
bolt 37 extends transverse to the barrel  
member 23, and has studs 47 which  
project at each end beyond the body of  
the slave head assembly 12 so as to  
engage respective linear cam surfaces  
49 at a station 14 for parking the slave  
head assembly 12.

When the tongs are introduced to the  
station 14 from the left in Fig. 1 the  
position shown in attained with the  
cams 49 having depressed bolt 37  
against spring bias so that the barrel  
may be withdrawn with head remaining  
attached through the engagement of  
studs 47 in recesses 54.

The head is recaptured by inserting  
barrel 23 from the left and pushing,  
removing studs 47 from recesses 54  
and allowing latch bolt 37 to re-engage  
the barrel.

Fig. 1



GB 2 093 518

1/4

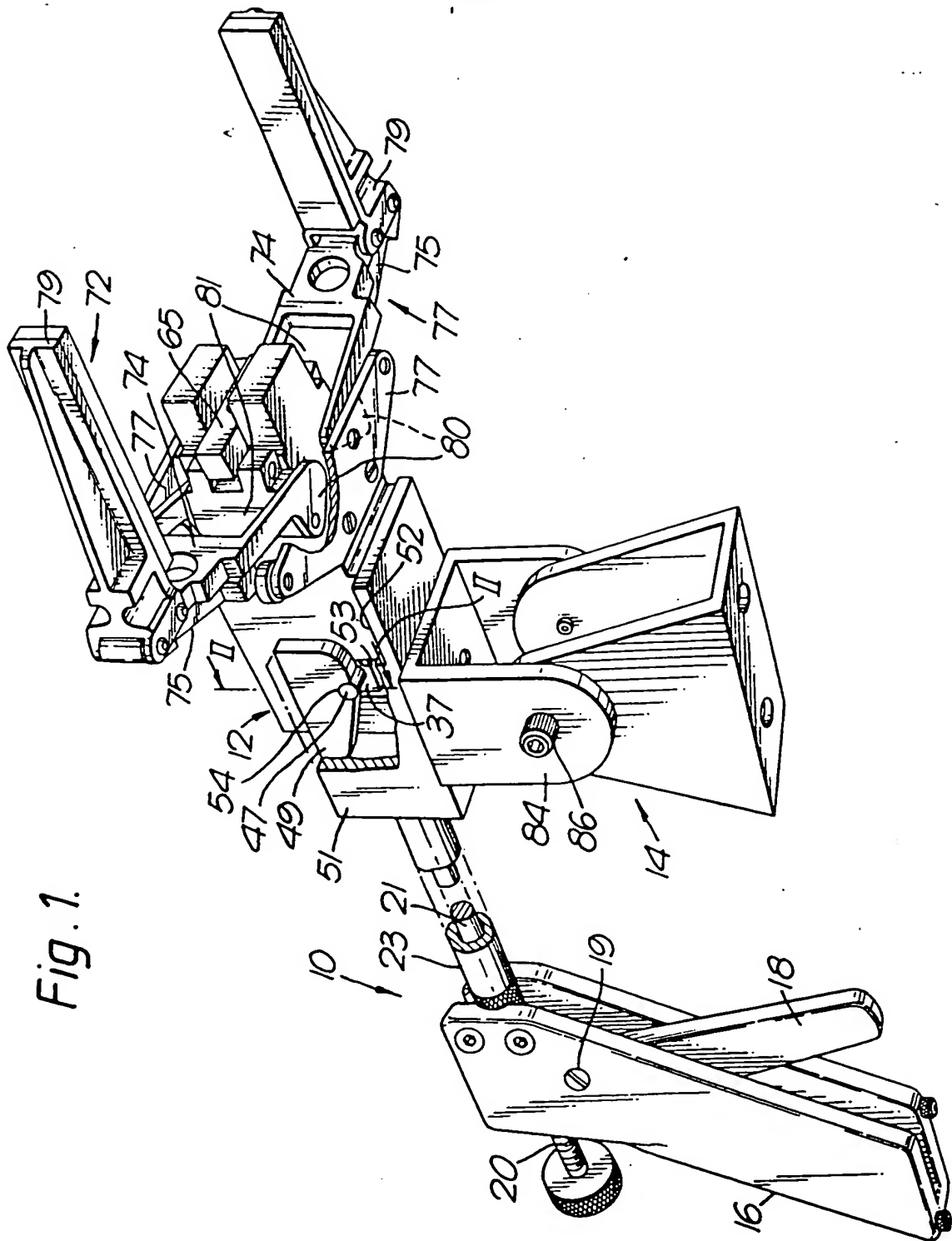


Fig. 1.

2/4

Fig. 1a.

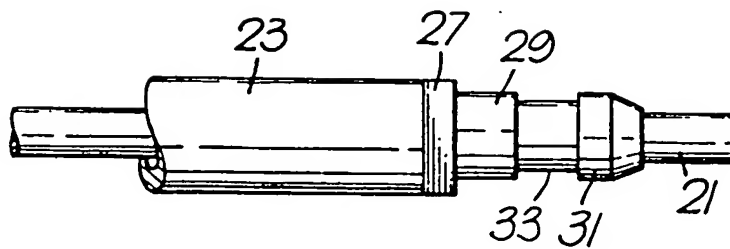
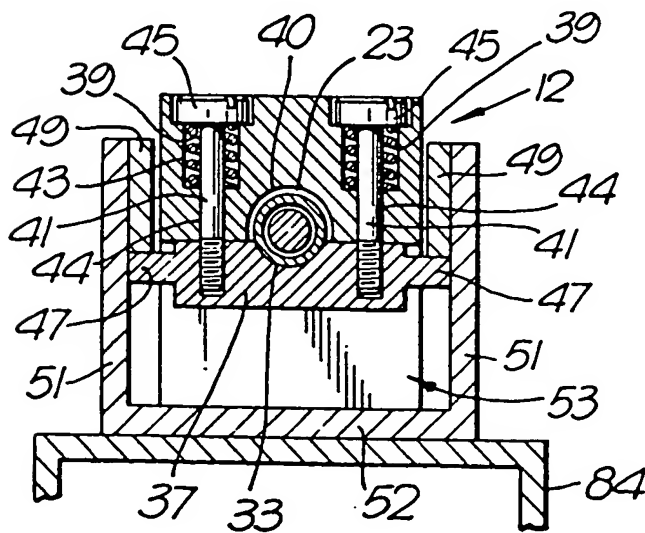
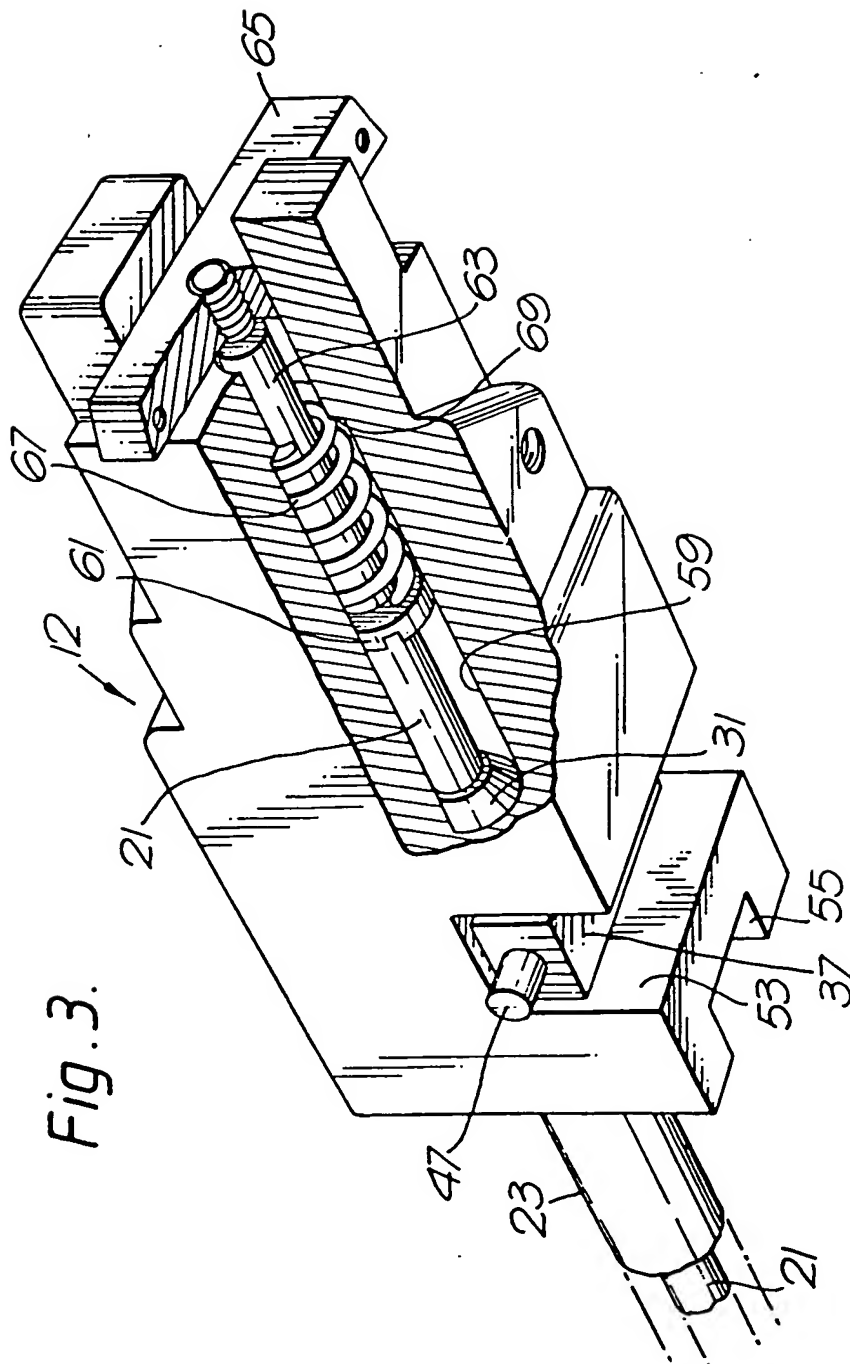


Fig. 2.



3/4





## SPECIFICATION

## Improvements in or relating to remote handling tongs

5 This invention relates to a remote handling tong in which a slave head assembly at one end of a barrel member of the tong can be operated remotely by an operator. Such tongs have been used for very many  
10 years in the nuclear industry for the handling of items in a radioactive environment, and enable an operator to stand at one side of an enclosure containing the items to be handled with the tong extending through a biological shield of the enclosure to  
15 permit the handling of the items remotely.

It is conventional practice to make interchangeable slave head assemblies which can be changed remotely, for example to replace a defective head assembly or to fit a slave head assembly having an  
20 element or elements thereon adapted for fulfilling a particular function (e.g. jaws, or a hacksaw), the withdrawal or attachment of the slave head assembly being carried out with the known slave head assemblies at a station having a feature which  
25 releases latches in the slave head assembly in the form of leaf spring elements which engage a circumferential groove in the barrel member.

According to the present invention, in a slave head assembly for attachment to a barrel member of a  
30 remote handling tong, there is provided a latch for engaging a catch in the barrel member, the latch comprising a rigid member extending transverse to the barrel member and resiliently biased in a direction to engage the catch.

35 Preferably, the rigid member projects at least at one end thereof beyond the adjacent portion of the slave head assembly so as to cooperate with means for withdrawing the rigid member away from the catch at a station for holding the slave head assembly  
40 thereon.

Desirably, said means comprises at least one linear cam surface for engaging the projecting end of the rigid member, and the cam surface may be shaped to provide a detent for locating the end of the  
45 rigid member therein when the rigid member has been withdrawn from the catch, so as to hold the slave head assembly at the station.

The rigid member is conveniently square or rectangular in cross-section, and desirably comprises hardened steel. The catch may be a circumferential groove in the barrel member.  
50

It will be understood that the invention also includes a station adapted to cooperate with the slave head assembly of the invention.

55 The invention will now be further described by way of example only with reference to the accompanying drawings, in which:—

Figure 1 shows a perspective view of a remote handling tong and a station therefor;

60 Figure 1a shows a fragmentary side view of one end of the tong of Figure 1;

Figure 2 shows part of a sectional view on the line

II-II of Figure 1;

Figure 3 shows a fragmentary partly broken away  
65 perspective view of part of the tong of Figure 1, and Figure 4 shows a modification of the view of Figure 2.

Referring now to Figure 1, a remote handling tong 10 is shown connected to a slave head assembly 12  
70 which is held by a station 14. The tong 10 is of a well known design which does not form part of the invention, and comprises a handle 16 in which a trigger 18 is pivotally mounted on a shoulder screw 19 so as to bear against the end (not shown) of a push rod 21  
75 extending inside a tubular barrel 23, a screw 20 being provided to hold the trigger 18 against the push rod 21 when desired. The barrel 23 is held at one end in the handle 16, and at the other end thereof as shown in Figure 1a, has a square-shaped  
80 portion 27, and a cylindrical surface 29 and a nose 31 from which the push rod 21 extends separated by a catch 33 in the form of a cylindrical surface of reduced diameter.

In the sectional view of Figure 2 to which reference  
85 is made, the barrel 23 is shown within a cylindrical hole 40 in the slave head assembly 12, and a hardened steel latching bar 37 which is square in transverse section has a concave surface 38 which is held in the catch 33 of the barrel 23 by the action of two  
90 compression springs 39 disposed about respective screws 41 secured to the latching bar 37 one each side of the hole 40. The springs 39 locate in respective counterbores 43 so as to bear under a cylindrical head 45 of each screw 41, the screws 41 extending  
95 through clearance holes 44 to the latching bar 37. A cylindrical lug 47 projects from each end of the latching bar 37 to engage the underside of a respective linear cam plate 49 secured to a respective wall 51 extending upwardly from a base 52 of the station 14. The  
100 latching bar 37 is movable in a direction normal to the catch 33 in a slot 53 and is moved away from the catch 33 when the slave head assembly 12 is initially pushed through the station 14 until the lugs 47 are held in respective detents 54 (see Figure 1) in the  
105 cam plates 49.

Referring now to Figure 3, in the part of the slave head assembly 12 shown, a rectangular channel 55 extends through the rear end of the slave head assembly 12 to provide a location for the square  
110 shaped portion (not shown in Figure 3) of the barrel 23 and thus prevents the barrel 23 from rotating in the slave head assembly 12. The nose 31 of the barrel 23 locates in a stepped cylindrical hole 59 in the slave head assembly 12, and the push-rod 21 butts  
115 against a head 61 of a shoulder screw 63 which is secured at the other end thereof to a yoke 65, a compression spring 67 locating behind the head 61 and against a shoulder 69 of the stepped hole 59 to bias the head 61 towards the push-rod 21.

120 Referring again to Figure 1, a conventional jaw assembly 72 forms part of the slave head assembly 12, and is actuated by movement of the yoke 65. The jaw assembly 72 comprises arms 74, 75 of a parallel motion linkage 77, the arms 74, 75 each being pivot-

ally mounted at one end thereof in a pivot plate 77 at the bottom and at the top (not shown) of the slave head assembly 12. The other ends of the arms 74, 75 are pivotally mounted at the same spacing as that in the pivot plates 77 in respective jaw members 79 such that the arms 74, 75 move parallel to each other. Each arm 74 has a lug 80 in which a link 81 is pivotally connected to a respective end of the yoke 65 so that movement of the yoke 65 causes corresponding movement of the links 81 which causes the arms 74 to pivot and thereby actuate the jaw assembly 72.

In order to allow the station 14 to be aligned with the barrel 23, the base 52 is mounted on a swivel mounting 84 of the station 14 which can be locked at a required position by a nut 86.

In use of the invention, with the slave head assembly 12 on the end of the barrel 23, the slave head assembly 12 is placed on the base 52 of the station 14 with the lugs 47 behind the cam plates 49. The slave head assembly 12 is then pushed through the station 12 so that the lugs 47 are depressed by the cam plates 49 to pull the latching bar 33 away from the catch 33 in the barrel 23 until the lugs 47 engage the detents 54. The barrel 23 can then be pulled away from the slave head assembly 12 to leave the slave head assembly 12 on the station 14.

The slave head assembly 12 can be attached again to the end of a barrel 23 by inserting the barrel 23 into the cylindrical hole 40 in the slave head assembly 12 until the square-shaped portion 27 locates in the slot 55, and then pushing the slave head assembly 12 with the barrel 23 so that the lugs 47 are pushed out of the detents 54 and are gradually released by the cam plates 49 to allow the latching bar 37 to engage the catch 33 in the barrel 23. Once the lugs 47 are free of the cam plates 49 the slave head assembly 12 can be lifted away from the station 14 by the barrel 23.

It will be understood that a latch of an alternative cross-section and a catch of an alternative shape may be used, and if desired, alternative arrangements for resiliently biasing the latch towards the catch may be provided, for example as shown in Figure 4 to which reference is now made.

In Figure 4, the barrel 23 is shown within a cylindrical hole 90 in a slave head assembly 91 similar in most respects to the slave head assembly 12 of Figures 1 to 3. However, a hardened steel latching bar 92 which locates in a slot 93 having parallel sides, is held in the catch 33 of the barrel 23 by the action of a compression spring 94, the spring 94 locating at one end in a cylindrical hole 95 in the latching bar 93 and extending normal to the longitudinal axis of the barrel 23. The other end of the spring 94 locates about a cylindrical post 96 having a rounded end 97 and extending from a keep plate 98 secured to the slave head assembly 92 by screws (not shown). Unlike the latching bar 37 of Figure 4, the latching bar 92 has a flat surface 99 which engages in the catch 33. A cylindrical lug 47 projects from each end of the latching bar 92 to engage the underside of a respective linear cam plate 49 in the same manner as that

from the catch 33.

#### CLAIMS

1. A slave head assembly for attachment to a barrel member of a remote handling tong, and including a latch for engaging a catch in the barrel member, wherein the latch comprises a rigid member extending transverse to the barrel member and resiliently biased in a direction to engage the catch.
2. An assembly as claimed in Claim 1, wherein the rigid member has a flat face engageable with the catch.
3. An assembly as claimed in Claim 1, wherein the rigid member has a concave portion thereof engageable in the catch.
4. An assembly as claimed in Claim 2 or Claim 3, wherein the catch comprises a circumferential groove in the barrel member.
5. An assembly as claimed in any one of the preceding Claims, wherein the rigid member is of square or rectangular cross-section, and slidably locates in a slot having parallel sides.
6. An assembly as claimed in any one of the preceding Claims, wherein the rigid member comprises hardened steel.
7. An assembly as claimed in any one of the preceding Claims, wherein the resilient bias is provided in a direction normal to the longitudinal axis of the barrel member.
8. An assembly as claimed in Claim 7, wherein the rigid member defines a location for one end of a spring means, the spring means providing the resilient bias.
9. An assembly as claimed in Claim 8, wherein the location comprises a cylindrical hole and the other end of the spring means locates about a post which extends inside the hole.
10. An assembly as claimed in any one of Claims 1 to 6, wherein the resilient bias is provided by two spring means equi-spaced about the barrel member.
11. An assembly as claimed in any one of the preceding Claims, wherein the rigid member projects at least at one end thereof beyond the adjacent portion of the slave head assembly so as to cooperate with means for withdrawing the rigid member away from the catch at a station for holding the slave head assembly thereon.
12. An assembly as claimed in Claim 11, wherein the one end of the rigid member is of cylindrical form.
13. An assembly as claimed in Claim 11 or Claim 12, wherein both ends of the rigid member project and cooperate with a respective withdrawing means.
14. A station for holding thereon a slave head assembly as claimed in any one of Claim 11 to 13, the station including said withdrawing means for engaging a respective said projecting end of the rigid member.
15. A station as claimed in Claim 14, wherein the withdrawing means comprises linear cam means.
16. A station as claimed in Claim 15, wherein the linear cam means is disposed so that the underside thereof with respect to the station engages the

wherein the surface of the or each linear cam means defines a detent for locating the respective projecting end of the rigid member therein, and the surface is shaped in a manner to allow the slave head

5 assembly to be pushed through the station.

18. A station as claimed in any one of Claims 14 to 17, wherein the station includes a base in opposing relationship with the surface of the or each linear cam means and spaced therefrom such that  
10 the slave head assembly is urged against the base as the respective projecting end of the rigid member engages the linear cam means.

19. A station as claimed in Claim 18, wherein the base is defined between spaced apart walls each  
15 supporting a linear cam means, and the base is supported by a lockable swivel mounting means.

20. A slave head assembly for attachment to a barrel member of a remote handling tong, substantially as hereinbefore described with reference to  
20 Figures 1, 1a, 2 and 3, or to Figures 1, 1a, 3 and 4, of the accompanying drawings.

21. A station for holding thereon a slave head assembly as claimed in Claim 20, substantially as hereinbefore described with reference to Figures 1  
25 and 2, or to Figures 1 and 4, of the accompanying drawings.

---

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd.,  
Berwick-upon-Tweed, 1982.  
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY,  
from which copies may be obtained.